

Abstract Submitted
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Blackbody Radiation: Kirchhoff's Error Propagates Beyond Einstein PIERRE-MARIE ROBITAILLE, The Ohio State University — A perfect absorber (approximated by graphite) is a blackbody. However, in 1860, Kirchhoff inappropriately concluded that a perfect reflector could also yield blackbody radiation. This led to the idea that such radiation was independent of the nature of the emitting object. Both Planck and Einstein, without sufficiently considering Kirchhoff's experimental work and theoretical conclusion, adopted the concept of universality—a view that persists to this day. In 1917, Einstein reinforced this concept. Assuming transitions between two states and equilibrium with a Wien's radiation field, Einstein was able to derive Planck's equation for blackbody radiation. Unfortunately, there is no experimental evidence that a radiation field which obeys Wien's Law can ever be produced in the absence of condensed matter. Consequently, under closer consideration, Einstein's derivation, far from affirming universality, directly invokes the presence of a solid (through the need to generate Wien's radiation field) and thereby restricts blackbody radiation to this state of matter. The belief that blackbody radiation is universal is not supported in the experimental setting.

Pierre-Marie Robitaille
The Ohio State University

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